

Physicochemical properties of starches from seed and rhizome of *Enhalus acoroides*

ABSTRACT

Starch, especially from terrestrial plants, is widely used in food and non-food industries. Marine macrophytes such as *Enhalus acoroides* also provide a considerable amount of starch in their storage parts such as rhizomes and seeds, but these have yet to be explored to fully understand their functionality. This study focused on the morphology, chemical composition and functional properties of starch from *Enhalus acoroides* collected from Tanjung Adang Laut shoal, Johor, Malaysia. Starch granules from the seeds were oval, 4.6-28.0 μm in length along the major axis, and possessed a centric Maltese cross, whereas starch granules from the rhizome were rod-shaped, 28.9-53.8 μm long, and with both centric and eccentric Maltese crosses. Seeds yielded 48.9% total starch, much higher than 14.4% in rhizomes. In contrast, resistant starch and amylose accumulated in the rhizomes were 75.3% and 18.8% compared to 1.7% and 10.8% in the seeds, respectively. As for proximate composition, the seeds contained 7.5% protein and 1.4% lipid, both higher than the 3.3% protein and 0.3% lipid in the rhizomes. The phosphorus content of rhizome starch was higher (429.6 mg/kg) than in the seed starch (117.9 mg/kg). X-ray diffractograms showed that the seed starch possessed A-type crystallinity, while rhizome starch was categorized under C-type crystallinity. For starch gelatinization, the seed starch required higher energy (7.7 Jg⁻¹) than the rhizome starch (4.8 Jg⁻¹) while the viscosity value of both seed and rhizome starches were similar. The findings obtained may serve as baseline data and as a guideline on the usage of *E. acoroides* starches in food and non-food formulations.

Keyword: *Enhalus acoroides*; Starch; Amylose; Crystallinity; Resistant starch